

by northeast gales. In the Twin Cities (St. Paul and Minneapolis) the storm was especially intense. On the southern side of the disturbance severe thunderstorms were a feature, accompanied by southwest to northwest gales. In portions of Kansas and Missouri some tornadoes occurred. An interesting feature of the storm was a deposit of "red mud" over a wide area, including at least eastern Iowa, southern Wisconsin, and northern Illinois.

Other special warnings issued during the month were those for stock interests in South Dakota, Nebraska, Kansas, and Wyoming on the 15th, and the western portions of Kansas and Nebraska on the 28th; also a heavy-snow warning for northern Missouri on the 16th.

Frost and cold-wave warnings for the benefit of the strawberry interests in southwestern Missouri were begun on the 15th, this being an annual feature of the work of this office. The season lasts until April 20.—*C. A. Donnel.*

NEW ORLEANS FORECAST DISTRICT

A cold wave of considerable severity overspread the greater portion of the district, extending to the coast, on the 9th and 10th, for which timely warnings were issued. Warnings which were verified were issued on the 13th for a cold wave on the Texas coast. Warnings were issued on the 16th, 17th, and 30th for cold waves which occurred over limited areas in the northwest portion of the district. Conditions were threatening on the 31st, and cold-wave warnings were ordered for the Texas coast; a decided fall in temperature occurred, but the lowest temperature was 42° to 46°. No cold waves occurred without warnings and no warnings were issued which were not justified.

Storm warnings were displayed on the Texas coast on the 9th, 13th, 17th, 22d and 28th, and on the Louisiana coast on the 13th and 19th. Storm winds occurred with each display on the Texas coast, but at New Orleans the velocities did not quite reach the requirement for verification. Small-craft warnings were issued for portions of the West Gulf coast on the 3d, 8th, 9th, 12th, 13th, 15th, 16th, 19th, 22d, 28th, and 31st, all of which were justified. No storms occurred without warnings and no warnings, except as needed, were issued.

Special wind warnings were issued on the morning of the 28th and distributed over the States in the district as follows: Louisiana, increasing southerly winds; Arkansas, thunderstorms, fresh to strong southerly winds, probably gales, this afternoon and tonight; Oklahoma, strong southerly winds this afternoon, shifting to northwest early Saturday; east Texas, fresh to strong southerly winds this afternoon and to-night, shifting to westerly Saturday. Damaging winds occurred in Arkansas, Oklahoma and northern Texas.—*I. M. Cline.*

DENVER FORECAST DISTRICT

The month was especially cold and stormy throughout, with a succession of lows advancing across the district from the Pacific coast or from the middle and southern portions of the Rocky Mountain Plateau.

On the morning of the 2d, when a disturbance of marked intensity was central over Nevada, livestock warnings were issued for western Colorado, northern New Mexico, northern Arizona, and Utah, snow and much colder weather, with strong shifting winds, having been forecast for that territory. Light snow, with considerably lower temperatures and fresh to strong shifting winds, attended or followed the passage of the storm eastward.

Livestock warnings were also issued on the morning of the 8th for southwestern Colorado and northern New Mexico, when another disturbance was central over that region. Light to moderately heavy snow, attended by strong shifting winds, occurred during the 8th in the territory designated, followed by a sharp fall in temperature that amounted to a cold wave at Santa Fe and Durango on the morning of the 9th.

On the morning of the 15th, when a disturbance of unusual intensity was central over western Colorado, with a pressure of 29.34 inches at Grand Junction and rapidly increasing pressures to the northward and northwestward, warnings of a moderate cold wave were issued for western Colorado, northeastern Arizona and southern Utah "to-night" and for northern New Mexico "to-night and Sunday." The warning was extended to southern New Mexico on the evening of the same date. The temperatures in northeastern Arizona and southwestern Utah were 20° lower on the evening of the 15th than at the same time on the 14th, with a minimum of 14° at Modena and of 18° at Flagstaff on the morning of the 16th. A sharp fall also occurred in the remainder of the territory for which the warnings were issued, but it was not sufficient to amount to a cold wave, another low that produced a modifying effect having begun to develop over Nevada during the 16th.

Warnings of a moderate cold wave in southeastern Colorado were issued on the morning of the 28th, when the pressure at Denver and Pueblo had fallen to 29.24 inches. From the temperatures reported from extreme western Kansas, the warning appears to have been verified over a portion of southeastern Colorado, although the fall at Pueblo amounted to but 14° during the following 24 hours, with a minimum of 36° reported from that station on the morning of the 29th.

A cold wave without warning occurred at Santa Fe and Durango on the morning of the 9th, although, as already stated, livestock warnings had been issued for southwestern Colorado and northwestern New Mexico. A local cold wave, without warning, also occurred at Pueblo on the morning of the 17th.

The following frost warnings were issued: 5th, 6th, 28th, and 29th, southern New Mexico; 8th, south central and southwestern New Mexico and southern and western Arizona; 9th, southwestern Arizona; 11th, south central and southwestern New Mexico; 12th, south central and southwestern New Mexico and southern Arizona; 15th, 16th and 22d, southern Arizona; 19th, south central and southwestern Arizona; 23d, southeastern New Mexico; 30th southern New Mexico and south central and southwestern Arizona.

Freezing temperature warnings were issued as follows: 5th, 8th and 17th, extreme southeastern New Mexico; 9th and 19th, southern New Mexico and southeastern Arizona; 13th, 16th and 22d, southern New Mexico; 30th, extreme southeastern New Mexico and extreme southeastern Arizona; 31st southern New Mexico.

As a rule, the conditions forecast were verified by temperatures favorable for the formation of frost, or by the occurrence of frost or freezing weather.—*J. M. Sherier.*

SAN FRANCISCO FORECAST DISTRICT

The pressure movements over this district during March, 1924, were of the type usually associated with early spring. The storms which entered the continent south of the international boundary, were of small area and rapid movement and developed greatly in energy after passing inland, while the large storms from the